

CLAIMS:

1. A filtration system comprising at least one flexible filter for filtering a fluid and cleaning apparatus for
5 projecting a flow of fluid onto the at least one flexible filter; wherein, in use, the fluid to be filtered passes through the at least one flexible filter and causes the at least one flexible filter to be deflected in a first direction, and the flow of fluid projected onto the at
10 least one flexible filter from the cleaning apparatus causes the at least one flexible filter to be deflected in a second direction.
2. A filtration system as claimed in claim 1, wherein the
15 at least one filter defines a chamber.
3. A filtration system as claimed in claim 2, wherein said at least one filter is deflected inwardly, into said chamber, by the passage of the fluid to be filtered through
20 the at least one filter and is deflected outwardly, out of said chamber, by the flow of fluid projected from the cleaning apparatus.
4. A filtration system as claimed in any one of claims 1,
25 2 or 3, wherein the cleaning apparatus comprises a rotatable member.
5. A filtration system as claimed in any one of the preceding claims, wherein the at least one flexible filter
30 is supported by a frame member.
6. A filtration system as claimed in any one of the preceding claims, wherein the at least one flexible filter

is bowed when it is deflected in said first and second directions.

7. A filtration system as claimed in any one of the
5 preceding claims comprising a plurality of flexible
filters, wherein the flexible filters are arranged to form
a cylinder.

8. A filtration system as claimed in any one of the
10 preceding claims, wherein the at least one flexible filter
is made of polyester.

9. A filtration system as claimed in any one of the
preceding claims, wherein the at least one filter is made
15 of a plastics material having anti-bacterial properties.

10. A filtration system operable in a filtration mode and
a purging mode, the system comprising at least one flexible
filter; wherein, in use, said at least one flexible filter
20 is deflected in a first direction when the system is
operating in said filtration mode, and is deflected in a
second direction when the system is operating in said
purging mode.

25 11. A filtration system for filtering particulate material
from a fluid, the filtration system comprising at least one
flexible filter capable of being deflected by the flow of
fluid through it.

30 12. A filter for filtering particulates from a flow of
fluid, the filter comprising at least one flexible filter
mesh capable of being deflected by the flow of fluid
through it.

13. A filter as claimed in claim 12, wherein the filter is a cylindrical filter.

14. A method of manufacturing a filter for a filtration
5 system, the filter comprising at least one filter mesh and a frame, the method comprising the steps of:

- (a) locating said at least one filter mesh in a mould; and
- (b) injecting plastics material into the mould to form said frame and to fix said at least one filter mesh in said

10 frame.

15. A method as claimed in claim 14, wherein said at least one filter mesh is mounted in a support member and said support member and the filter mesh are located in the mould
15 prior to the injection of said plastics material.

16. A method as claimed in claim 14 or 15, wherein said at least one filter mesh is flexible and, in use, is capable of being deflected by the flow of fluid through it.

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17. A method as claimed in any one of claims 14, 15 or 16, wherein said filter is a cylindrical filter

18. A filter manufactured by the method claimed in any one
25 of claims claim 14 to 17.

19. A filtration system for filtering particulates from a liquid, the system comprising a sealed vessel suitable for supporting a pressure less than atmospheric pressure, and a
30 filter for filtering particulates from said liquid.

20. A filtration system as claimed in claim 19, wherein a first chamber is defined in the sealed vessel and the filter is provided in said first chamber.

21. A filtration system as claimed in claim 19 or 20 further comprising air evacuation means suitable for evacuating air from the system.

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22. A filtration system as claimed in claim 21, wherein the air evacuation means is arranged to evacuate air from the sealed vessel.

10 23. A filtration system as claimed in claim 21 or 22, wherein the air evacuation means is a venturi.

24. A filtration system as claimed in any one of claims 19 to 23 further comprising a pump suitable for reducing the
15 pressure in said sealed vessel to cause liquid to be drawn into the vessel.

25. A filtration system as claimed in claims 23 and 24, wherein the venturi is connected on the pressure side of
20 the pump.

26. A filtration system as claimed in claim 24 or 25 further comprising a valve sub-system operable to change the connection of the pump to the sealed vessel.

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27. A filtration system as claimed in claim 26, wherein the valve sub-system is operable to connect the pump upstream of the sealed vessel to cause the system to operate in a purging mode.

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28. A filtration system as claimed in claim 27, wherein, when the system is operating in said purging mode, the pump introduces a purging liquid into the sealed vessel to flush filtered particulates through a discharge outlet.

29. A filtration system as claimed in claim 28, wherein the valve sub-system is operable to open and/or close the discharge outlet.

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30. A filtration system as claimed in claim 28 or 29, wherein the purging liquid is liquid taken from upstream of the filter.

10 31. A filtration system as claimed in any one of claims 26 to 30, wherein the valve sub-system is operable to connect the pump downstream of the sealed vessel to cause the system to operate in a filtration mode.

15 32. A filtration system as claimed in claim 31, wherein, when the system is operating in the filtration mode, the pump draws the liquid supply into the system through a system inlet, the system inlet being connected to at least one conduit having at least one opening.

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33. A filtration system as claimed in any one of claims 19 to 32 further comprising a biological filter.

25 34. A filtration system as claimed in claim 33, wherein said biological filter is provided in a second chamber having an annular cross-section and extending circumferentially around the sealed vessel.

30 35. A filtration system as claimed in claim 34, wherein biological filter comprises media and the inlet to the second chamber is arranged such that, when liquid is drawn into the second chamber, the media are agitated.

36. A filtration system as claimed in any one of claims 19 to 35 further comprising a UV light module.

5 37. A filtration system as claimed in any one of claims 19 to 36 further comprising a filter cleaning apparatus for projecting a cleaning liquid onto a downstream side of the filter to dislodge particulates trapped on an upstream side thereof.

10 38. A filtration system as claimed in claim 37 further comprising a flow compensating device for increasing the proportion of the cleaning liquid directed to the filter cleaning apparatus when the filter is partially blocked.

15 39. A filtration system as claimed in claim 38, wherein the flow compensating device is a spring-loaded valve.

20 40. A filtration system as claimed in claim 37, 38 or 39, wherein the cleaning liquid is liquid filtered by the filter.

41. A filtration system as claimed in any one of claims 37 to 40 when dependent directly or indirectly on claim 13, wherein the cleaning liquid is supplied to the filter
25 cleaning apparatus only when the system is operating in a filtration mode.

42. A filtration system as claimed in claim 41, wherein the supply of cleaning liquid is controlled by the valve-
30 subsystem.

43. A filtration system as claimed in any one of claims 37, 38 or 39 when dependent directly or indirectly on claim 28, wherein the purging liquid is introduced into the

sealed vessel through said filter cleaning apparatus when the system operates in said purging mode.

44. A filtration system as claimed in any one of claims 37
5 to 43 when dependent directly or indirectly on claim 24,
wherein the cleaning liquid is supplied to the filter
cleaning apparatus by the pump.

45. A filtration system as claimed in any one of claims 37
10 to 43, wherein the cleaning liquid is supplied to the
filter cleaning apparatus by a separate dedicated pump.

46. A filtration system as claimed in any one of claims 37
15 to 45, wherein the cleaning apparatus comprises a rotatable
member having an outlet for projecting the cleaning liquid
onto a surface of the filter.

47. A filtration system as claimed in claim 45 wherein the
rotatable member is rotatably mounted on a tubular member
20 having at least one side-opening for supplying cleaning
liquid to said rotatable member.

48. A filtration system as claimed in claim 47 further
comprising a closure member for closing an end of the
25 tubular member and for re-directing liquid introduced into
the tubular member through the at least one side-opening.

49. A filtration system as claimed in claim 48, wherein
the closure member is generally frusto-conical in shape.
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50. A filtration system as claimed in claim 48 or 49,
wherein the closure member is fixedly attached to the
tubular member.

51. A filtration system as claimed in claim 48 or 49, wherein the closure member is integrally formed with the tubular member.

5 52. A filtration system as claimed in any one of claims 19 to 51, wherein the filter is a cylindrical mesh defining a third chamber.

10 53. A filtration system as claimed in claim 52 wherein the filter is provided in said sealed vessel and the liquid supply is introduced into the sealed vessel to the outside of the cylindrical mesh.

15 54. A filtration system as claimed in any one of claims 19 to 53, wherein the filter is provided in an upper portion of the sealed vessel to facilitate, in use, the settling of particulates in a lower portion thereof.

20 55. A filtration system as claimed in claim 54, wherein at least one baffle plate is provided in the sealed vessel.

25 56. A filtration system as claimed in claim 55, wherein the at least one baffle plate is hollow frusto-conical in shape.

57. A filtration system as claimed in any one of claims 54, 55 or 56, wherein a settling chamber is defined in a lower portion of the sealed vessel.

30 58. A filtration system as claimed in claim 57, wherein the settling chamber is provided beneath the filter.

59. A filtration system as claimed in claim 57 or 58, wherein the settling chamber is defined by a cylindrical member open at its upper end.

5 60. A filtration system as claimed in claim 57, 58 or 59, wherein the settling chamber is provided with an outlet for evacuating particulates.

61. A filtration system as claimed in any one of claims 19
10 to 60 further comprising a pressure relief valve.

62. A filtration system as claimed in claim 61 wherein the pressure relief valve is operable to prevent the pressure in the sealed vessel falling below a predetermined level.
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63. A filtration system as claimed in claim 61 or 62 when dependent directly or indirectly on claim 24, wherein the pressure relief valve is operable to place an outlet of the pump in communication with an inlet of the pump when the
20 pressure in the sealed vessel falls below said predetermined level.

64. A filtration system for filtering particulates from a fluid, the filtration system comprising a filter and a
25 chamber for collecting particulates; the system further comprising at least one baffle member for reducing the velocity of fluid in the chamber and/or the velocity of fluid entering said chamber.

30 65. A filtration system as claimed in claim 64, wherein said at least one baffle member is ring-shaped in plan form.

66. A filtration system as claimed in claim 64 or 65, wherein said at least one baffle member is hollow frusto-conical in shape.

5 67. A filtration system as claimed in claim 64, 65 or 66, wherein said at least one baffle member has a downwardly sloping top surface.

68. A filtration system as claimed in any one of claims 64
10 to 67 comprising first and second baffle members, wherein the first baffle member has a first top surface and the second baffle member has a second top surface, the first top surface sloping downwardly in a first direction and the second top surface sloping downwardly in a second
15 direction, said first and second directions being substantially opposite to each other.

69. A filtration system as claimed in claim 68, wherein the first and second baffle members are ring-shaped in plan
20 form, the first direction being radially outwards and the second direction being radially inwards.

70. A filtration system as claimed in claim 69, wherein the first baffle member is provided above the second baffle
25 member.

71. A container for collecting particulates in a fluid filtration system, the container having a chamber and being provided with at least one baffle member for reducing the
30 velocity of fluid in the chamber and/or the velocity of fluid entering said chamber.

72. A container as claimed in claim 71, wherein the or each baffle plate is ring-shaped in plan form.

73. A container as claimed in claim 71 or 72, wherein the or each baffle member is hollow frusto-conical in shape.

5 74. A container as claimed in claim 71, 72, or 73, wherein said at least one baffle member has a downwardly sloping top surface.

75. A method of operating a filtration system to filter
10 particulates from a liquid, the method including a filtration step and a purging step;

the filtration step comprising reducing the pressure in a sealed vessel below atmospheric pressure to cause liquid to be drawn into the sealed vessel, and passing
15 liquid to be filtered through a filter;

the purging step comprising introducing a purging liquid into the sealed vessel to expel particulates filtered from the liquid through a discharge outlet.

20 76. A method as claimed in claim 75, wherein a pump reduces the pressure in the sealed vessel by drawing liquid out of the sealed vessel; and the purging liquid is introduced into the sealed vessel by the same pump.

25 77. A method as claimed in claim 76, wherein a changeover valve is operated to change the pump connections to the sealed vessel to change the operational mode of the filtration system.

30 78. A method as claimed in any one of claims 75, 76 or 77, wherein the purging liquid is liquid taken from the same source as the liquid to be filtered.

79. A filter cleaning apparatus comprising a rotatably mounted member having at least one outlet for projecting cleaning liquid onto a surface of a filter, the rotatable member having a channel connecting at least one inlet aperture to said at least one outlet, the rotatable member being mounted on a tubular member having at least one side-opening therein, the at least one side-opening being in liquid communication with said at least one inlet aperture.
- 10 80. A filter cleaning apparatus as claimed in claim 79, wherein the rotatable member comprises a central collar, said collar extending substantially around said tubular member and being at least partially open to the interior thereof to define said at least one inlet aperture.
- 15 81. A filter cleaning apparatus as claimed in claim 79 or 80, wherein first and second annular projections are provided on the outer surface of the tubular member to axially locate said rotatable member.
- 20 82. A filter cleaning apparatus as claimed in claim 79, 80 or 81, wherein a closure member is provided for directing liquid introduced into the tubular member radially outwardly into the at least one inlet aperture in the
- 25 rotatable member.
83. A filter cleaning apparatus as claimed in claim 82, wherein the closure member is frusto-conical in shape.
- 30 84. A filter cleaning apparatus comprising a rotatable member having at least one outlet for projecting fluid onto a surface of a filter, the rotatable member comprising a collar rotatably mounted on a support member and there

being provided at least one fluid pathway for allowing fluid to escape between the support member and the collar.

85. A filter cleaning apparatus as claimed in claim 84,
5 wherein a first guide member is provided on the support member to limit upwards displacement of the rotatable member relative to the support member; wherein the fluid pathway or one of said fluid pathways is formed by a gap provided between the collar and said first guide member.

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86. A filter cleaning apparatus as claimed in claim 85, wherein the gap between the collar and the first guide member is less than or equal to 1mm.

15 87. A filter cleaning apparatus as claimed in claim 85 or claim 86, wherein the first guide member extends around the support member.

88. A filter cleaning apparatus as claimed in any one of
20 claims 84 to 87, wherein a second guide member is provided on the support member to limit downwards displacement of the rotatable member relative to the support member; wherein the fluid pathway or one of said fluid pathways is formed by a gap provided between the collar and said second
25 guide member.

89. A filter cleaning apparatus as claimed in claim 88, wherein the gap between the collar and the second guide member is less than or equal to 1mm.

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90. A filter cleaning apparatus as claimed in claim 88 or claim 89, wherein the second guide member extends around the support member.

91. A filter cleaning apparatus as claimed in any one of claims 84 to 90, wherein said at least one fluid pathway is annular and extends substantially around the support member.

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92. A filter cleaning apparatus as claimed in any one of claims 84 to 91, wherein the support member is a tubular member.

10 93. A filtration system comprising a chamber housing a biological filter media, wherein liquid to be biologically filtered is introduced into the chamber through an inlet, and said inlet is arranged such that, in use, the liquid agitates the filter media.

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94. A filtration system as claimed in claim 93, wherein the inlet is arranged such that, in use, the liquid is introduced into the chamber in a tangential direction for creating a rotational flow in said chamber.

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95. A filtration system as claimed in claim 93 or 94, wherein the chamber is annular in cross-section.

25 96. A filtration system as claimed in claim 95, wherein the annular chamber extends circumferentially around a central chamber.

97. A filtration system as claimed in claim 96, wherein said central chamber houses a mechanical filter.

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98. A filtration system for filtering water from a body of water, the system comprising a filter and a pump, the filter being provided on the suction side of the pump when the system is operating in a filtration mode; wherein the

system is adapted to allow water from the body of water to be filtered when the system is located above the water level in the body of water.

5 99. A sealed vessel to be used in the filtration system of any one of claims 1 to 11; 19 to 70; or 93 to 98.

100. A vessel for use in a filtration system, the vessel comprising a collection chamber for collecting particulates
10 filtered from a fluid, wherein a settling chamber is provided in said collection chamber.

101. A vessel as claimed in claim 100 further comprising a first discharge outlet to facilitate expulsion of filtered
15 particulates from the collection chamber and a second discharge outlet to facilitate expulsion of filtered particulates from the settling chamber.

102. A vessel as claimed in claim 100 or 101 wherein the
20 settling chamber is defined by a cylindrical sidewall and is open at its upper end.

103. A vessel as claimed in claim 100, 101 or 102 further comprising a baffle plate.

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104. A vessel as claimed in claim 103 wherein the baffle plate is hollow frusto-conical in shape.

105. A filtration system comprising a vessel as claimed in
30 any one of claims 100 to 104.

106. A filtration system as claimed in claim 105 further comprising a cylindrical filter.

107. A filtration system as claimed in claim 106 wherein the settling chamber is provided below the filter.

5 108. A filtration system as claimed in claim 107 wherein the settling chamber is cylindrical and the settling chamber and the filter are arranged co-axially.

10 109. A filtration system substantially as herein described with reference to Figures 1 to 8; or Figures 1 to 6, 9 and 10.

110. A vessel for use in a filtration system substantially as herein described with reference to Figures 1 to 8; or Figures 1 to 6, 9 and 10.

15 111. A filter cleaning apparatus substantially as herein described with reference to Figures 1 to 8; or Figures 1 to 6, 9 and 10.